Long-Term Consequences of School Segregation: The Impact of School SES, Racial Density and Racial Diversity on Future Earnings

Orhan Agirdag

In the field of sociology of education, few topics have received more attention than the consequences of school segregation. The significance of this issue can hardly be overestimated, as school integration is directly related to vital challenges for multiethnic nations, such as social cohesion and civic engagement (Orfield and Lee 2005; Frankenberg and Orfield 2007; Mickelson and Nkomo 2012). Hence, in the aftermath of the historic *Brown v. Board Of Education* decision of the Supreme Court that ended *de jure* school segregation in 1954, the effects of *de facto* school segregation have been investigated in virtually hundreds of studies (for reviews: Schofield 1991; Wells and Crain 1994; Driessen 2007).

In their review of the literature, Wells and Crain (1994) argue that there is an important distinction between two research traditions that focus on the consequences of school segregation. The first tradition focuses on the *short-term* effects of school composition characteristics. In most cases, these studies examine whether a school's racial composition and socioeconomic status (SES) composition (*hereafter*: school SES) have an impact on individual students' academic achievement. Studies in the United States and other parts of the world have generally found that school SES is related to academic achievement, even after controlling for many individual and school-level variables (Lee and Smith 1997; Rumberger and Palardy 2005; Dronkers 2010; Agirdag, Van Avermaet and Van Houtte 2013; for a meta-analysis: van Ewijk and Sleegers 2010a). Most previous studies also point at a negative relationship between high concentrations of ethnic/racial minority students and academic performance, and the disadvantaged students are found to suffer the most from racial isolation (e.g. Bankston and Caldas 1996; Mickelson 2001; Borman et al. 2004; Hanushek, Kain and

Rivkin 2009; for a meta-analysis: van Ewijk and Sleegers 2010b). Partly as a reaction to the limited scope of these short-term studies, a second research tradition emerged, with scholars focusing on the *long-term* effects of school segregation (see Braddock 1980; Wells and Crain 1994; Mickelson and Nkomo 2012). These scholars have argued that racial isolation of minority pupils may have consequences for long-term outcomes, such as college attainment, socioeconomic attainment, health outcomes and income.

Research on the racial makeup of schools primarily focused on one specific dimension of the racial composition, namely on school racial *density*, which is typically operationalized by the proportion of Whites or the proportion of minority students in a school. However, school racial *diversity*, which is another dimension of school racial composition, is highly neglected. Density measures tell us little about the effects of diversity. For instance, consider a school with only Black students and another one with only White students. In terms of racial diversity these schools are the same: they are both non-diverse. However, in terms of racial density, they are opposites. In contrast, a school with 25% White, 25% Black, 25% Latino and 25% Asian students is obviously more racially diverse. The levels of this racial diversity or heterogeneity can only be measured by a proper diversity index such as the Simpson index or the Herfindahl index. While there are some recent studies on short-term outcomes that do include a diversity index (e.g. Dronkers 2010; Benner and Crosnoe 2011; Agirdag, Van Houtte and Van Avermaet 2011, 2012), we are not aware of any long-term study that do so. Consequently, the long-term effects of school racial diversity remain largely unknown. The primary objective of the present study is to address this research lacuna by examining the impact of school SES, school racial density and school racial diversity on students' future earnings. By doing so, our second aim is to contribute to developments in the perpetuation theory (Braddock 1980; Wells and Crain 1994), and the constrict theory (Putnam 2007).

Literature Overview

Long-Term Effects of Segregation and the Perpetuation Theory

Most studies on the long-term consequences of school segregation draw upon the perpetuation theory, which was originally developed by Braddock (1980) and expanded by Wells and Crain (1994). The perpetuation theory states that racial segregation tends to repeat itself across various institutions over the course of life. As a result, Black and Latino students in segregated schools (i.e. schools with a low share of White enrollment) do not develop networks with White students and do not acquire the skills necessary to interact with Whites. However, these interracial networks and skills are important for minorities because Whites constitute the dominant/mainstream racial group within the broader society. For instance, interracial networks might carry high-status knowledge such as college admission procedures and they might function as referrals for job applications. In sum, the perpetuation theory states that school segregation might result in a lack of social ties with Whites and the inability to form such networks, which in turn might reduce the life chances of Black and Latino students.

Several empirical studies found support for the predictions of the perpetuation theory. They revealed that school segregation is related to various long-term outcomes, such as college attainment, socioeconomic status attainment, health outcomes and labor income (Crain and Mahard 1978; Braddock and McPartland 1982; Southworth and Mickelson 2007; Goldsmith 2009; Stearns, Buchmann and Bonneau 2009; Stearns 2010; Johnson 2011). For elaborated reviews of these long-term studies, we refer to a well-established review by Wells and Crain (1994), and to a more recent review by Mickelson and Nkomo (2012). Here, we will limit our discussion to those studies that have focused on the impact on earnings.

We identified five studies that examine the impact of schools' racial makeup on individuals' earnings (Crain 1970; Boozer, Krueger and Wolkon 1992; Grogger 1996; Rivkin 2000; Johnson 2011). With the exception of Rivkin (2000), these studies found that racial segregation is significantly related to students' earnings. Crain (1970) found that Blacks who

had attended schools with a higher White enrollment share had higher wages. The difference between the annual income of male alumni of integrated and segregated schools was 344 dollars. Adjusted for inflation, this number would be currently (in the year 2013) about 2,300 dollars. Crain calculated that the net difference (i.e. after controlling for educational attainment) was still 220 dollars (1,450 dollars when adjusted for inflation). A study by Boozer and colleagues (1992) used the National Survey of Black Americans and they found that the proportion of Blacks in school was negatively related to respondents' wages. It should be noted that Crain (1970) and Boozer et al. (1992) used cross-sectional retrospective data of alumni. Grogger (1996), on the other hand, draws a similar conclusion with longitudinal NLS72 data. He reports that moving from an all-Black school to an all-White school would result in a wage increase of 8%. However, these studies are criticized by Rivkin (2000), who states that they did not provide statistical controls for individual differences in socioeconomic background. He additionally argued that high school quality, not the percentage of Whites, is related to earnings. A more recent study by Johnson (2011) used the Panel Study of Income Dynamics longitudinal household survey to analyze the life trajectories of children born between 1950 and 1970, and followed through 2007. He found that school desegregation was significantly related to higher income. It is revealed that an additional year of exposure to court-ordered desegregation increased black men's annual earnings by almost 6 percent.

School Racial Diversity and the Constrict Theory

The above discussed studies focus mostly on the racial *density* dimension of school racial composition (which is measured by the share of Whites or the share of Blacks in a school), and on the effects of court-ordered desegregation plans. More recently, scholars have attempted to analyze the racial *diversity* dimension, which is measured by a diversity index that takes heterogeneity of various groups into account. These studies are, however, limited to

short-term outcomes (e.g. Graham, 2006; Dronkers 2010; Benner and Crosnoe 2011; Agirdag et al 2011, 2012).

The constrict theory, as put forward by Robert Putnam (2007), can be considered to conceptualize both the short- and long-term effects of school racial diversity. Constrict theory states that at the short-term ethnic/racial diversity triggers social anomie ('hunkering down'), and consequently, the level of ethnic/racial diversity in a given social context is related to broad set of unfavorable short-term outcomes. Putnam revealed that in ethnically diverse communities (measured by Herfindahl-index), people had lower trust in others, they cooperated less, and they had fewer friends (for the entire list of outcomes, see Putnam, 2007:149-150). Inspired by Putnam's work, Dronkers (2010) argued that ethnic diversity might also have negative consequences in school settings. For instance, teacher effectiveness might suffer due to problems associated with school ethnic diversity (such as decreasing levels of trust and cooperation among teachers, students and parents), which might in turn have negative consequences on students' academic achievement. Dronkers (2010) used the PISA 2006 data from 15 countries to show that there is a negative association between school ethnic diversity (measured by Herfindahl index) and students' academic achievement, though these effects are rather small and are only significant for immigrants. In contrast, by using data from the Early Childhood Longitudinal Study, Benner and Crosnoe (2011) have found that school ethnic/racial diversity of the elementary school (measured by Simpson index) is positively associated with academic achievement. Other authors focused on the non-cognitive effects of school ethnic/racial diversity. Graham (2006), for example, demonstrated that pupils at more racially diverse schools (measured by Simpson index) are less likely to be victimized, and that this holds for both ethnic minority and majority students. Van Houtte and Stevens (2009) revealed that school ethnic diversity (measured by Herfindahl index) is related to increasing interethnic friendships. Agirdag and colleagues (2011, 2012) found that a higher

level of school ethnic diversity (measured by Herfindahl index) is related to lower self-esteem and lower national identifications.

Unfortunately, these studies on school ethnic/racial diversity paid no attention to a second important argument in Putnam (2007): the constrict theory states that at the long-term ethnic diversity is likely to be an asset and to be related to (economic) benefits. That is because exposure to ethnic/racial diversity goes hand in hand with exposure to diverse worldviews. As such, people in diverse settings are more frequently inclined to question their own assumptions about the world, which stimulates innovativeness, creative thinking and problem-solving skills (see Cox 1994; McLeod, Lobel and Cox 1996; Antonio, Chang, Hakuta, Kenny, Levin & Milem 2004, Scott, 2007). It is obvious that these skills and competencies are very valuable assets at the labor market, not to mention that companies in the US spend billions of dollars on diversity training (Hansen 2003). Therefore, if racially diverse schools foster skills such as innovativeness, creative thinking and problem-solving, and if racially diverse schools increase students' familiarity with racial diversity, we might expect that student will have long-term benefits from attending those schools, which will be reflected in their occupational attainments and earnings levels. It should be noted that neither Putnam nor others have provided any empirical evidence on the hypostatized long-term effects of racial diversity. Hence, the present study (in which we analyze the impact of school racial diversity on students' future earnings) might be a unique attempt to examine the long-term implications of the constrict theory.

Sample and Design

Data for the present study came from the National Education Longitudinal Study of 1988/2000 (NELS), which was administered by the National Center for Educational Statistics. The selection of participants was based on a two-stage stratified sample with schools as the first-stage unit and a sample of students within each selected school as the second-stage unit.

The NELS survey was initiated in 1988 and included over 24,000 8th grade students across 1000 schools in the US. The final follow-up with information about the employment status and income of 12,000 respondents was conducted in the year 2000, that is, when most respondents had turned 26. For the analysis here, the sample was restricted to respondents who worked part-time or full-time during 1999 and/or 2000. To assure reasonable reliability of the within and between-school parameters, we further limited the sample to those students who attended schools in 1988 with at least four other respondents (see also Rumberger and Palardy 2005). Ultimately, the analyses were conducted with 10,363 respondents, clustered in 893 schools. Because the respondents were clustered within schools, we used multilevel regression analysis, conducted with SPSS version 20. Estimates were produced by using the NELS-weight variable F4PNLWT, which is the 1988-2000 panel weight for the eighth-grade grade class of 1988. Metric variables are grand mean centered. Missing data was handled with the multiple imputation procedure. According to Bodner (2008) the number of imputations should be similar to the percentage of cases that are incomplete. In the sample of 10,363 pupils, 12% of the cases were incomplete. As such, 12 imputations are requested, and the pooled results are shown.

Variables

Here we describe the operationalization of the variables. The NELS variable names are given between brackets. The dependent variable is *logged earnings* (F4BRATP and F4BRATE). The respondents were asked to state how much they earned in 2000 before taxes and other deductions. They could report their earnings hourly, weekly, bimonthly, monthly or annually. We converted all earnings responses to annual earnings by multiplying by common factors: hourly earnings by 2,100, weekly by 52, bi-monthly by 24, and monthly by 12. Following the convention, we will use the logged earnings in the analysis.

The main independent variables are three school composition variables: school SES, school racial density, and school racial diversity. *School SES* is measured by the average of individual SES of students in the 8th grade sample. Higher scores indicate higher school SES. *School racial density* is operationalized by the percentage White students at 8th grade. While some other studies use the percentage of racial minorities, we prefer the share of White students because this measure is more in line with the perpetuation theory, which focuses on exposure to Whites. *School racial diversity* is measured by the Herfindahl index, which is basically the same measure as the Simpsons index. This index calculates the probability that any two students randomly selected from the same setting will be from a different racial group. Higher scores indicate higher levels of racial diversity. The exact formula is:

$$-1 \times [(\%\ \text{Whites})^2 + (\%\ \text{Asian})^2 + (\%\ \text{Hispanic})^2 + (\%\ \text{Blacks})^2 + (\%\ \text{Native-American})^2]$$

As shown in Table 1, there is a large bivariate correlation between school SES and school racial density (r = 0.370), and between school racial density and school racial diversity (r = 0.581). To avoid interpretation errors due to problems of multicollinearity, we will compare the results of the model in which all school composition variables are entered together with the results of models in which school composition variables are entered separately.

[TABLE 1 ABOUT HERE]

To rule out selection effects, we control for a number of variables at the individual and school-level, which are potentially correlated with the outcome. At the school-level we control for *school sector* (G8CTRL1), *region* (G8REGON) and *urbanicity* (G8URBAN). At the individual level we control for *gender* (SEX), *race* (RACE), *SES* (BYSES), and *educational attainment* (F4HSTYPE and F4HHDG). SES is measured by an index of family

income, education, occupational prestige, and possessions. Higher scores indicate higher SES. Educational attainment is measured by the highest degree of education that an individual has completed at age 26. Five degrees are distinguished: (1) No high-school diploma or equivalent, (2) High-school diploma or equivalent (3) Associate degree (4) Bachelor degree, (5) Master or PhD degree. We refer to Table 2 for descriptive statistics.

[TABLE 2 ABOUT HERE]

Results

In order to assess whether school context matters with respect to earnings, the variance components from the unconditional model is calculated. We are particularly interested in the variance at the school level, which is computed as the between-school variance component divided by the sum of the within-school variance and between-school variance [$\tau 0 / (\sigma^2 + \tau 0)$]. We calculated that 19.55% ($p < 0.001$) of the variance occurs at the school-level [0.069 / (0.284 + 0.069)], which is comparable with the school-level variance of studies on academic achievement.

In Table 3, we present the results of multilevel regression analysis on logged earnings. Regarding the effects of school composition variables, the SES composition of the student body is significantly related to students' future earnings: all else being equal, attending a school with a higher mean SES results in higher earnings ($b = 0.040$, $p = 0.05$). School racial diversity is also a positively related to students' future income ($b = 0.105$, $p = 0.017$). However, school racial density (i.e. percentage of White students) does not reach a conventional significance level ($b = -0.013$, $p = 0.710$). While control variables are not the primary concern of this study, we note that race has a significant influence: there is an income gap between racial minorities and Whites, except for Asians who earn the same as Whites.

[TABLE 3 ABOUT HERE]

Because school composition variables are strongly interrelated (see Variables section), we also calculated the effects of school composition variables separately. The results are presented in Table 4. For the sake of compactness, control variables are not shown in the table. The results in Table 4 demonstrate that the signs and the sizes of the coefficients are almost the same as in Table 3, i.e. when school composition variables were entered together in the model. The only difference is that the impact of racial diversity is now significant at a higher level (b = 0.112, p < 0.001). These results indicate that the insignificance of school racial density cannot be explained by its strong relationship to school SES.

[TABLE 4 ABOUT HERE]

In the analyses above, we tacitly assumed that the effects of school composition characteristics do not vary across students' race, which might not be a realistic assumption (Grogger 1996; Johnson 2011). To assess whether the impact of school segregation on future earnings differs across various racial groups, we calculated cross-level interaction effects between school composition variables and students' race. The results are presented in Table 5, and for the sake of compactness, control variables are not shown in this table. The results point out that the effect of school SES and school racial diversity significantly interact with students' race. To be more specific, school SES has a larger effect on the earnings of Native-Americans (b = 0.126, p = 0.025), Hispanics (b = 0.105, p = 0.022) and Black students (b = 0.164, p < 0.000) than on the earnings of Whites. Moreover, the insignificant main effect of school SES (b = 0.012, p = 0.602) indicates that school SES does not have an impact on

future earnings of White students. This finding suggests that school SES has a compensating role with respect to racial income gap. The cross-level interactions between school racial diversity and students' race reveal similar results. That is, school racial diversity has a larger effect on Hispanics (b = 0.330, p = 0.003) than on Whites. The main effect of school racial diversity turns out to be insignificant (b = 0.025, p = 0.734), which indicates that racial diversity does not have an impact on Whites. In sum, these results suggests that school SES and school racial diversity has a positive effect on the future earnings of those racial groups that are typically disadvantaged at the labor market (Hispanics, Blacks and Native-Americans). As such, school SES and school racial diversity might have important implications for the existing racial inequalities at the labor market. A more complete illustration of the compensating role of school integration with respect to racial income gap is provided in Figure 1.

[FIGURE 1 ABOUT HERE]

[TABLE 5 ABOUT HERE]

Discussion

In the current study, we sought to contribute to the literature on the long-term consequences of school segregation. To be more specific, we examined the impact of three dimensions of school segregation on the future earnings of students. We did not only focus on the effects of school SES and school racial density, but we did include the neglected effects of school racial diversity. Our results have implications for both theoretical developments on the long-term effects of school segregation and for educational policy.

The analyses demonstrated that the socioeconomic makeup of the schools and school racial diversity are both predictors of students' future income. Even when educational

attainment is taken into account, students who were enrolled in schools with a higher mean SES in 1988 reported higher earnings in 2000. We also found that attending a more racially diverse school resulted in increased income. However, school racial density, as measured by the percentage of White peers, had no significant effect, even when school SES and racial diversity were not taken into account. Nevertheless, these effect of school SES and school racial diversity do not equally apply to all racial groups. Cross-level interactions between school composition variables and students' racial background revealed that school SES and school racial diversity were only related to the earnings of racial groups that are typically disadvantaged at the labor market, i.e. Hispanics and Blacks. Incomes of advantaged racial groups, i.e. Whites and Asians, were not affected by school composition variables. As such, school SES and racial diversity do not only increase students' labor market success, but they do also (partly) compensate for existing racial income inequalities. This finding is in line with the results of a recent study by Johnson (2011), who found that exposure to desegregation programs might increase Black students' future income, while there is no significant effect on Whites' income.

This study has important implications for both the perpetuation theory and the constrict theory. First, our results point to an important deficit of the perpetuation theory which states that racial *density* (i.e. contact with *White* peers) has beneficial long-term effects for racial minorities. While we have found that school composition has long-term effects, it seems that school SES and school racial *diversity* matter for racial minorities, not that much school racial *density* as measured by the share of Whites. In other words, the present study does not disconfirm the perpetuation theory, but it questions the focus of perpetuation theorists on the value of White peers: its seems that having a racially diverse peer network is more valuable than having a network of White peers *per se*. Therefore, we argue for a reformulation of the perpetuation theory in terms of racial diversity and SES composition. A

second theoretical contribution of the present study is related to the constrict theory as proposed by Putnam (2007). As far as we know, the present study is a unique examination of the long-term implications of the constrict theory, which states that ethnic/racial diversity has important benefits in the long-run, even if diversity comes with short-term challenges for the society. Supporting the long-term implications of the constrict theory, we did found that school racial diversity is positively related to the future earnings. However, the fact that Whites and Asians are not affected by school racial diversity challenges Putnam's (2007) assertion that *both* advantaged and disadvantaged groups will be affected equally by racial diversity. Two previous studies on the short-term consequences of school diversity did also found that school diversity had only an effect on ethnic minorities (Dronkers 2010; Demanet, Agirdag and Van Houtte 2012). Hence, a reformulation of the constrict theory should take these differential effects into account. To do so, it might be necessary to examine *why* diversity is related to specific outcomes, which is a blind spot of the constrict theory. The theoretical framework provided by Page (2007), on the processes through which group diversity results in improved performance, might be a good starting point to fill this lacuna of the constrict theory.

In sum, our results suggest that school integration can reduce racial income inequalities, as school racial diversity and school SES composition is related to earnings of disadvantaged racial minorities without harming the labor market benefits of Whites and Asians. Therefore, even if the legal climate does not favor desegregation, our policy recommendation is that there should be innovative plans to use (non-forced) assignment and choice policies to foster more integrated schools.

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Table 1: Zero-Order Correlations Between School Composition Variables

	School SES	Racial density	Racial diversity
School SES	1		
Racial density	0.370***	1	
Racial diversity	-0.064	-0.581***	1

Note: ***p < 0.001

Table 2: Descriptive Statistics

	N	Min	Max	Mean or %	SD
School-level variables					
School composition					
School SES	893	-1.38	1.53	0.00	0.52
Racial density (% White)	891	-70%	30%	0.00%	32.24%
Racial diversity (HI)	891	-0.27	0.48	0.00	0.22
School sector					
Public	747	0	1	83.65%	
Private	146	0	1	16.35%	
Urbanicity					
Urban	233	0	1	26.09%	
Sub-urban	389	0	1	43.56%	
Rural	271	0	1	30.35%	
School region					
North East	174	0	1	19.48%	
Midwest	228	0	1	25.53%	
South	319	0	1	35.72%	
West	171	0	1	19.15%	
Student-level variables					
Race					
Native-American	99	0	1	0.96%	
Asian	613	0	1	5.92%	
Hispanic	1218	0	1	11.75%	
Black	832	0	1	8.03%	
White	6893	0	1	66.52%	
Gender					
Male	4791	0	1	46.23%	
Female	4958	0	1	47.84%	
SES	9749	-2.44	2.64	0.00	0.77
Educational attainment					
No high-school	530	0	1	5.11	
High school	5411	0	1	52.21	
Associate	791	0	1	7.63	
Bachelor	3131	0	1	30.21	
Master or PhD	399	0	1	3.85	
Logged earnings	9823	0.00	13.12	10.16	0.60

Table 3: Multilevel Regression on Logged Earnings

	b	*se*	*p*
Intercept	10.464	0.044	***
School composition			
School SES	0.040	0.019	*
Racial density (% White)	-0.013	0.034	ns.
Racial diversity (HI)	0.105	0.043	*
School sector			
Public	-0.054	0.025	*
Ref: Private			
Urbanicity			
Urban	0.012	0.022	ns.
Sub-urban	0.058	0.018	**
Ref: Rural			
School region			
North East	0.022	0.025	ns.
Midwest	0.030	0.024	ns.
South	-0.004	0.022	ns.
Ref: West			
Race			
Native-American	-0.109	0.021	***
Asian	0.013	0.012	ns.
Hispanic	-0.028	0.010	*
Black	-0.103	0.011	***
(ref: White)			
Gender			
Male	0.315	0.003	***
Ref: Female			
SES	0.018	0.002	***
Educational attainment			
No high-school	-0.592	0.012	***
High school	-0.444	0.010	***
Associate	-0.415	0.012	***
Bachelor	-0.183	0.010	***
Ref: Master or PhD			

Notes:

ns.: non-significant; *p ≤ 0.05; **p ≤ 0.01; ***p ≤ 0.001

Weighted with F4PNLWT

Table 4: Multilevel Regression Models for Logged Earnings: School Composition Variables Entered Separately

	School SES	Racial density	Racial diversity
b	0.036	-0.023	0.112
se	0.016	0.027	0.036
p	*	ns.	***

Notes:

ns.: non-significant; *p ≤ 0.05; ***p ≤ 0.001

Weighted with F4PNLWT

Same control variables as Table 3 are included

Table 5: Multilevel Regression Models for Logged Earnings with Cross-Level Interaction Terms Between School Composition Variables and Race

	b	(se)	*p*
School composition (on White)			
School SES	0.012	0.021	ns.
Racial density (% White)	-0.058	0.075	ns.
Racial diversity (HI)	0.025	0.074	ns.
Race			
Native-American	-0.065	0.077	ns.
Asian	0.060	0.043	ns.
Hispanic	0.198	0.036	***
Black	0.006	0.023	ns.
(ref: White)			
School SES x Race			
Native-American	0.126	0.049	*
Asian	-0.005	0.018	ns.
Hispanic	0.105	0.044	*
Black	0.164	0.014	***
(ref: White)			
Racial density x Race			
Native-American	-0.016	0.075	ns.
Asian	-0.056	0.078	ns.
Hispanic	-0.046	0.065	ns.
Black	-0.046	0.064	ns.
(ref: White)			
Racial diversity x Race			
Native-American	0.016	0.121	ns.
Asian	0.016	0.087	ns.
Hispanic	0.330	0.087	**
Black	0.080	0.080	ns.
(ref: White)			

Notes:

ns.: non-significant; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Weighted with F4PNLWT

Same control variables as Table 3 are included